

Exhibit 2



Insurance Institute for Highway Safety
Highway Loss Data Institute

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IIHS tests show benefits of side underride guards for semitrailers

A car was run into the side of a tractor-trailer to demonstrate the danger of side underride. In the second crash shown, the trailer had a side underride guard, which prevented the worst damage.

ARLINGTON, Va. — Strong underride guards on the rear of tractor-trailers have proven effective in preventing underride in crash tests conducted by the Insurance Institute for Highway Safety. Now, new IIHS tests show how a well-built guard can prevent a passenger vehicle from sliding beneath the side of a semitrailer.

The tests conducted this spring mark the first time that IIHS has evaluated a side underride guard. IIHS ran two 35-mph crash tests: one with an AngelWing side underride protection device from Airflow Deflector Inc. and a second test with a fiberglass side skirt intended to improve aerodynamics, not to prevent underride. The results were dramatically different.

In both tests, a midsize car struck the center of a 53-foot-long dry van trailer. In the AngelWing test, the underride guard bent but didn't allow the car to go underneath the trailer, so the car's airbags and safety belt could properly restrain the test dummy in the driver seat. In the second test with no underride guard for protection, the car ran into the trailer and kept going. The impact sheared off part of the roof, and the sedan became wedged beneath the trailer. In a real-world crash like this, any occupants in the car would likely sustain fatal injuries.

The Institute has been testing rear underride guards for several years. In March, IIHS [announced](#) the first winners of the new **TOUGHGUARD** award recognizing rear underride guards designed to prevent underride in a range of crashes into the backs of tractor-trailers. So far, five North American semitrailer manufacturers have qualified for the award.

The AngelWing side guard stopped the car from going underneath the trailer.



Without a side underride guard, the car in the second 35 mph test lodged beneath the trailer.



The latest tests illustrate the importance of countermeasures to prevent side underride crashes, too. In 2015, 301 of the 1,542 passenger vehicle occupants killed in two-vehicle crashes with a tractor-trailer died when their vehicles struck the side of a tractor-trailer. This compares with the 292 people who died when their passenger vehicles struck the rear of a tractor-trailer. Because of gaps in federal crash data, IIHS researchers can't determine exactly how many of these crashes involve underride, but they estimate that underride occurs in about half of fatal crashes between large trucks and passenger vehicles.

A 2012 IIHS study found that strong side underride guards have the potential to reduce injury risk in about three-fourths of large truck side crashes producing a fatality or serious injury to a passenger vehicle occupant. This proportion increased to almost 90 percent when restricted to crashes with semitrailers.

Federal law requires large trucks to have rear underride guards but not side underride guards. At least three U.S. cities — Boston, New York and Seattle — mandate side guards on city-owned and/or contracted trucks as part of Vision Zero initiatives to eliminate crash deaths and injuries, particularly among pedestrians and bicyclists.

"Our tests and research show that side underride guards have the potential to save lives," says David Zuby, the Institute's executive vice president and chief research officer. "We think a mandate for side underride guards on large trucks has merit, especially as crash deaths continue to rise on our roads."

The wheels on a tractor and trailer offer some underride protection if a passenger vehicle were to strike them. With no side underride guard, only 28 percent of a 53-foot trailer's length would be protected from underride. With the AngelWing side underride guard in place, 62 percent of the trailer's length would be protected. Side underride guards can be retrofitted to existing semitrailers.

"With the rise of injuries and fatalities due to truck crashes, along with the need for greener technologies, Airflow Deflector's AngelWing side underride guards are an integral part of a long-term eco-friendly and cost-effective safety strategy that will benefit the public at large," says Robert Martineau, president of Airflow Deflector.

Passenger vehicle occupant deaths in 2-vehicle crashes with tractor-trailers

Year	Passenger vehicle strikes side of tractor-trailer	Passenger vehicle strikes rear of tractor-trailer	All crashes with tractor- trailers
2005	441	258	1,932
2006	394	260	1,853
2007	417	218	1,771
2008	290	180	1,526
2009	269	174	1,237
2010	319	181	1,417
2011	246	189	1,362

2012	306	216	1,376
2013	274	213	1,377
2014	308	220	1,409
2015	301	292	1,542

More information

More on large trucks

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The **Insurance Institute for Highway Safety** is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from crashes on the nation's roads.

The **Highway Loss Data Institute** shares and supports this mission through scientific studies of insurance data representing the human and economic losses resulting from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle make and model.

Both organizations are wholly supported by auto insurers.